

Two probable reasons can be attributed for the death of the snake. The snake may have died due to the effect of toxins produced by the fishes or there might have been some difficulty in swallowing the two fishes and death may have been caused by asphyxiation.

## ACKNOWLEDGEMENT

I am thankful to Dr. A. Daniel, O/C, Z.S.I., Madras for providing facilities and giving constant encouragement.

MARINE BIOLOGICAL STATION,  
ZOOLOGICAL SURVEY OF INDIA,  
Madras-28,  
June 28, 1973.

T. VENKATESWARLU

## REFERENCES

- DAY, F. (1878): The Fishes of India, London.
- FUKUDA, T. (1951): Violent increase of cases of puffer poisoning. *Clinics and Studies*, 29 (2).
- HALSTEAD, W. BRUCE (1970): Poisonous and venomous marine animals of the world. Vol. 3. United States Govt. Printing Office, Washington, D.C.
- SHERMAN, A. MINTON JR. (1966): A contribution to the herpetology of West Pakistan. *Bull. Amer. Mus. Nat. Hist.*, 134: 31-184.
- SMITH, M. A. (1943): Fauna of British India. Reptilia and Amphibia. Vol. III. Serpentes. Taylor and Francis, London.

14. *ECHIS* COLLECTION IN RATNAGIRI DISTRICT

In July 1969 Mr R. Joshi of Deogad (Ratnagiri District) and myself supervised and participated in the collection of over 2,000 live specimens of *Echis carinatus* (Russel) for the venom production laboratory of Haffkine Institute of Bombay.

*The Catchers:*

A group of tribal people called Mahrs traditionally catch the 'phoorsi' (as they call the saw-scaled viper) in Ratnagiri District but catch no other snakes. They believe that the phoorsi can strike several feet so their catching apparatus consists of long-headed pincers about one metre in length made from bamboo, or may be a blacksmith fashioned forceps. They also carry a stout bamboo staff with an 8 inch spike through one end to serve as a rock turner. The collection basket is plastered with cow dung and has a weighted coconut shell for a secure lid.

*The Biotope :*

Coastal Ratnagiri District is comprised of rocky (laterite) tableland interspersed with small hillocks of boulders and patches of small forest growth. Most of the year hot and barren, the area literally sprouts life with the arrival of the monsoon (June-September). The tableland becomes slippery from algae and under rocks myriads of amphibians, reptiles and arthropods can be found, urgently feeding and breeding. All of the construction in the area is done with quarried laterite and in the vicinity of villages most of the loose rocks and boulders are gathered up to form boundary walls. Where the *Echis* go in the hot season is unknown and a subject of much speculation. Dr Vad of Haffkine and myself spent the better part of a day looking for *Echis* in May with no success. *Echis* is the most common reptile besides *Calotes*, its ecology is based on the rock strewn tableland which shelters them as well as their prey.

*Echis carinatus* ssp.:

This species is found in dry areas from Kenya in Africa to the Jaffna area in Ceylon with wide variation in size, coloration and pattern giving rise to several subspecies the classification of which is being worked upon by investigators such as Stemmler of Switzerland. The Ratnagiri form is a small snake averaging 250-300 mm in length with occasional individuals over 500 mm. It is mainly nocturnal in its habits as very few were collected in the open and of these only one was on the move. Its feeding and breeding habits have been noted by M. A. Smith and other authors, 3 large specimens (over 450) disgorged specimens of the black scorpion *Heterometrus* which measured over 100 mm. Also field mice (*Mus* sp.) were found disgorged in the collection boxes. Juvenile *Echis* were not collected but the ratio of young compared to 200 mm 'adults' was about 1:4. *Echis* exhibit variable temperaments like most snakes, some preferring escape when disturbed and others being very defensive, inflating their bodies and rubbing their body coils to produce the surprisingly loud hissing sound and striking repeatedly at the tormentor.

*The Collection :*

About 30 Mahrs were engaged for a total of 5 days during which over 2000 *Echis* were collected. 1200 were of the acceptable 200-300 mm length, 600 were over 300 mm and the remainder were under 200 mm. The average price paid to the collectors was 50 paise per

snake. The general method was for the Mahrs to scatter in the early morning to their various favoured collection areas and proceed to walk around turning over likely rocks and covering about 15 km during the day. On the first day, collecting alone I found 6 *Echis* under rocks. During the next days, using the experience of the Mahrs, in particular a man named Jamsandekar, my average daily catch was 15 *Echis*, not including babies. The Mahrs have been regularly catching *Echis* for Haffkine's antivenom production for the last 20 years and say that the species is getting noticeably scarcer around Deogad. After some experience one learns which rocks are more likely to be hiding an *Echis* (i.e. those that are not embedded or surrounded by soil and grass). The rock is quickly turned over by hand or stick and the phoorsi, if there, is quickly picked up with the tongs and deposited in the basket (or in some cases an ordinary tin). Some of the snakes are injured by the rough use of these forceps but the risk of bite is reduced to almost zero by this method. Other snakes encountered are either killed or left alone except for *Boiga trigonata* which is also caught and feared as being an extra long *Echis*!

#### General Notes :

Heavy concentrations of *Echis carinatus* are common in several parts of its range. In Kenya during 2½ months in 1962 and 1963 A. Duff-Mackey and J. Leakey captured 6,933 *Echis*. Wall reports a large population of *Echis* in N.W. India and in 'Ratnagiri District alone rewards were paid on an average of 225,721 Phoorsas per annum', during the late 1800's. Bites from *Echis* in Ratnagiri District and in areas of N.W. India like Punjab and in some parts of the South (around Madras and Trichy) are frequent but fortunately the relatively small size- of the central and southern form makes fatal bites extremely rare. However it appears that the larger race in N.W. India and Pakistan is potentially much more dangerous to man.

Other fauna found in conjunction with *Echis* under the thousands of stones we overturned are listed as follows :

#### SNAKES :

<i>Amphiesma stolatus</i>	—	2	Striped Keelback
<i>Boiga trigonata</i>	—	4	Catsnake
<i>Vipera russellii</i>	—	1	Russell's Viper
<i>Naja naja naja</i>	—	1	Cobra

#### LIZARDS :

<i>Calotes versicolor</i>	—	many	Garden lizard
<i>Riopa guentheri</i>	—	7	skink
<i>Ophisops beddomei</i>	—	5	skink

<i>Hemidactylus brooki</i>	—	many
<i>H. maculatus</i>	—	many
<i>H. frenatus</i>	—	many
<i>H. albofasciatus</i>	—	6

## FROGS

*Rana hexadactyla*  
*R. tigerina*  
*R. limnocharis*  
*R. cyanophlyctis*  
*R. breviceps* ssp.  
*Microhyla ornata*  
*Rhacophorus maculatus*

## Caecilian

One species, probably  
*Indotyphlus*—6

## ARTHROPODS :

<i>Heterometrus gravimanus</i>	—	Black scorpion
<i>Buthus tamulus</i>	—	Red scorpion
Chilopoda	—	Centipedes (with young)
Diplopoda	—	Millipedes
Crustacea	—	Crabs
Arachnida	—	Spiders
Forficulidae	—	Earwigs (with young)
Coleoptera	—	Beetles

*Conclusion :*

The biotope of Ratnagiri District in the State of Maharashtra is especially interesting for its very high population of *Echis carinatus*. Though an inhospitable area in monsoon it is an extremely valuable study area and worth more attention by herpetologists and entomologists in particular.

MADRAS SNAKE PARK TRUST,  
MADRAS-22,  
August, 1973.

R. WHITAKER

### 15. OCCURRENCE OF THE BAT-FISH, *PEGASUS VOLITANS* LINNAEUS (PEGASIFORMES : PEGASIDAE) FROM THE COASTAL WATERS OF INDIA

Day (1889) recorded *Pegasus draconis* Linnaeus from the Andamans; Johnstone (1904) and Munro (1955) recorded *Pegasus* (*Parapegusus*) *natans* (Linnaeus) from the Pearl Banks of Ceylon; and Munro (1955) recorded *Pegasus* (*Parapegusus*) *volans* (Linnaeus) and *Pegasus draconis* Linnaeus from Ceylon. According to Herre (1953) *Pegasus* (*Parapegusus*) *natans* (Linnaeus) and *Pegasus* (*Parapegusus*) *volans* (Linnaeus) are synonymous with *Pegasus volitans* Linnaeus. The family Pegasidae